



AMENDMENTS TO CLAIMS

Please amend claims 1, 3, 4, 6-13, 16, 17, 19, 21, 23-26, 28-32, 34, and 36-38.

Please add claims 39-46.

1. (Currently amended) A method of indicating ~~generating~~ cursor motion ~~on a~~ display from force applied to a ~~user-controlled~~ pointing device wherein a speed ~~velocity~~ of said cursor is related to a pointing component of the applied force according to a dual-gain transfer function.

2. (Original) The method according to claim 1 wherein a first derivative of said dual-gain transfer function is continuous.

3. (Currently amended) A method of indicating ~~generating~~ cursor motion ~~on a~~ display from force applied to a ~~user-controlled~~ pointing device comprising the steps of:

a. ~~applying~~ a first relatively low but non-zero gain to said force applied to said pointing device; and

b. ~~applying~~ a fraction of a second, relatively higher gain wherein said fraction of a second gain is based on a monotonically increasing function ~~monotonically increasing fraction of a second relatively higher gain as said force applied to said pointing device increases from zero.~~

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4. (Currently amended) The method according to claim 3 wherein said ~~fraction of said~~ monotonically increasing function ~~second relatively higher gain~~ increases smoothly.

5. (Original) The method according to claim 3 wherein said second relatively higher gain is applied only when a magnitude of a pointing component of said force is substantially non-decreasing.

6. (Currently amended) A method of indicating selection, based on a force applied to a ~~user-controlled~~ pointing device, comprising:

determining a period of relatively increasing vertical component of said force;

accumulating a magnitude of said vertical component of said force;

accumulating a magnitude of a pointing component;

comparing said magnitude of said vertical component of said force to said accumulation of said magnitude of said pointing component; and

determining that said magnitude of said vertical component of said force exceeds said magnitude of said pointing component by a predetermined threshold ~~in which said selection is indicated when, during a period of relatively increasing vertical component of said force, an accumulation of said vertical component exceeds an accumulation of a magnitude of a simultaneously applied pointing force by a predetermined threshold.~~

7. (Currently amended) The method according to claim 6 wherein a selection sensitivity is adjustable ~~adjusted to accommodate different operator preferences~~ by adjusting a value of said predetermined threshold.

8. (Currently amended) A method of maintaining selection based on a force applied to a ~~user-controlled~~ pointing device in which said selection is maintained if a vertical component of said force does not decrease relatively quickly, ~~and the~~ magnitude of the vertical component does not fall below a first minimum threshold, and the magnitude of the pointing component does not fall below a second minimum threshold ~~magnitudes of both the vertical component and a pointing component of said force do not fall below a minimum threshold.~~

9. (Currently amended) A method of indicating a short duration selection operation based on a force applied to a ~~user-controlled~~ pointing device, comprising ~~the~~ steps of:

a. ~~determining that a rate of increase of a vertical component of the applied~~ force has exceeded a first threshold,

b. ~~determining that the vertical component of said force has~~ ~~subsequently~~ exceeded a second threshold,

c. ~~determining that a rate of decrease of the vertical component of said~~ applied force has ~~subsequently~~ exceeded a third threshold,

~~d.~~ determining that said rate of decrease occurred within a certain time interval following occurrence of said rate of increase, and

~~e.~~ determining that an accumulation, over a period subtended by said rates of increase and decrease, of a the magnitude of a the pointing component of said applied force does not exceed a fourth threshold.

10. (Currently amended) A method of indicating ~~generating~~ cursor motion ~~on a display~~ from force applied to a ~~user-controlled~~ pointing device, comprising:

determining if a vertical component of the force is decreasing;

indicating a low cursor motion speed if the vertical component of the force is decreasing;

determining if a vertical component of the force is increasing and exceeding a magnitude of a pointing component of the force;

indicating a low cursor motion speed if the vertical component of the force is increasing and exceeding a magnitude of a pointing component of the force; and

relating cursor motion to the pointing component of the force if the vertical component of the force is not decreasing, and if the vertical component of the force is not increasing and not exceeding a magnitude of a pointing component of the force wherein a velocity of said cursor is negligible when a vertical component of the applied force is relatively decreasing, and is negligible when the vertical component of the applied force is both relatively increasing and exceeding a magnitude of a pointing component of the applied force, and is related to the pointing component of the applied force otherwise.

11. (Currently amended) A method of indicating motion, on a display, of an object from force inputs applied to an input device, comprising ~~the steps of~~:

retrieving force inputs from the ~~an~~ input device;

applying the retrieved force inputs to a dual gain transfer function to produce a motion signal; and

applying the motion signal to indicate motion for the ~~control an~~ object.

12. (Currently amended) The method according to Claim 11, wherein said input device is a ~~user-controlled~~ pointing device and said object is a cursor.

13. (Currently amended) The method according to Claim 11, wherein ~~said step of~~ applying the retrieved force inputs comprises applying a pointing component of the retrieved force inputs to said dual gain transfer function to produce said motion signal.

14. (Original) The method according to Claim 11, wherein a first derivative of said dual-gain transfer function is continuous.

15. (Original) The method according to Claim 11, wherein said dual gain transfer function comprises $M_n = L \cdot F_n + H \cdot S(F_n) \cdot F_n$.

16. (Currently amended) A method of indicating ~~generating~~ cursor motion ~~on a display~~ from force applied to a pointing device, comprising ~~the steps of~~:

generating a force signal from said force applied to said pointing device;

applying a first non-zero gain to said force signal;

applying a fraction of a second gain ~~relatively higher than said first gain~~ to said force applied to said pointing device, wherein said fraction of a second gain is a monotonically increasing function of said force applied to said pointing device ~~said fraction of the second gain monotonically increasing as said force applied to said pointing device increases~~; and

~~generating~~ indicating motion of said cursor based on the force signal to which said first and second gain have been applied.

17. (Currently amended) The method according to Claim 16, wherein said force applied to said pointing device is a pointing component of said force applied to said pointing device.

18. (Original) The method according to Claim 16, wherein said second gain is higher than said first gain.

19. (Currently Amended) The method according to Claim 16 in which said monotonically increasing function ~~fraction of said second gain~~ increases smoothly.

20. (Original) The method according to Claim 16, wherein said second gain is applied only when a magnitude of a pointing component of the force signal is substantially non-decreasing.

21. (Currently amended) A method of indicating selection based on a force applied to a ~~user-controlled~~ pointing device, comprising ~~the step of:~~

recognizing a period of relatively increasing selection force on said pointing device in which an accumulation of the selection force exceeds an accumulation of a magnitude of at least one other force ~~forces~~ on said pointing device by a predetermined threshold; and

indicating a selection based on the recognized period.

22. (Original) The method according to Claim 21, wherein said selection force is a vertical force on said pointing device.

23. (Currently amended) The method according to Claim 21, wherein said at least one other force comprises a force ~~forces comprise forces~~ applied in a substantially orthogonal direction ~~other than a direction of~~ to said selection force on said pointing device.

24. (Currently amended) The method according to Claim 21, wherein said at least one other force comprises a horizontal force ~~forces comprise horizontal forces~~ applied to the pointing device.

25. (Currently amended) The method according to Claim 21 wherein a selection sensitivity is adjustable by adjusting the predetermined threshold, ~~further comprising the step of adjusting a selection sensitivity of the pointing device by adjusting the predetermined threshold.~~

26. (Currently amended) A method of maintaining a selection of a pointing device, comprising ~~the steps of:~~

determining a selection and pointing component ~~components~~ of a force applied to said pointing device; and


maintaining a current selection if the pointing component of said force does not decrease more than a variable predetermined rate, a magnitude of the selection component of the force does not fall below a first minimum threshold, and a magnitude of the pointing component of the force does not fall below a second minimum threshold ~~magnitudes of both the selection and pointing components of said force do not fall below a minimum threshold.~~

27. (Original) The method according to Claim 26, wherein said selection component is a vertical component of said force.

28. (Currently amended) The method according to Claim 26, wherein said variable ~~predetermined~~ rate is approximately of ~~a current value of~~ the selection component of said force.

29. (Currently Amended) The method according to Claim 26, wherein said minimum threshold comprises approximately .03 of a maximum applied force.

30. (Currently amended) A method of indicating a short duration selection operation based on a force applied to a pointing device, comprising ~~the steps of~~:

 (a) ~~determining~~ that a rate of increase of a selection component of said applied force has exceeded a first threshold;

(b) ~~determining~~ that the selection component of said applied force ~~subsequent to step (a)~~, has exceeded a second threshold;

(c) ~~determining~~ that a rate of decrease of the selection component of said applied force, ~~subsequent to step (b)~~, has exceeded a third threshold;

(d) ~~determining~~ that said rate of decrease occurred within a predetermined time interval ~~following the rate of increase determined in step (a)~~;

(e) ~~determining~~ that an accumulation, over a period subtended by said rates of increase and decrease, of a ~~the~~ magnitude of the pointing component of said applied force does not exceed a fourth threshold; and

(f) indicating a short duration selection ~~when steps (a), (b), (c), (d), and (e) have been determined~~.

31. (Currently Amended) The method according to Claim 30, wherein said short duration selection is a click tap.

32. (Currently amended) A method of indicating ~~controlling~~ motion of an object from a force applied to a pointing device, comprising ~~the steps of~~:

(a) indicating an application of motion ~~applying motion~~ to said object according to a pointing component of the applied force;

(b) indicating a reduction of motion ~~reducing an amount of motion applied~~ to said object when a selection component of the applied force is decreasing at a rate faster than a predetermined decrease rate; and

(c) indicating an application of motion ~~reducing an amount of motion~~ ~~applied~~ to said object when a selection component of the applied force is increasing at a rate greater than a predetermined increase rate and exceeding a magnitude of a pointing component of the applied force.

33. (Original) The method according to Claim 32, wherein said object is a cursor.

34. (Currently amended) The method according to Claim 32, wherein said indication of reduced motion comprises ~~an amount of reduction of motion applied to said object in steps (b) and (c) comprise~~ setting a velocity of the object to zero.

35. (Original) The method according to Claim 32, wherein said selection component is a vertical component of the applied force.

36. (Currently amended) The method according to Claim 32, wherein said selection component is ~~force-applied~~ in a first direction and said pointing component is ~~force-applied~~ in a plane perpendicular to said first direction.

37. (Currently amended) A method of indicating ~~controlling~~ movement and selection from a pointing device, comprising ~~the steps of~~:

retrieving a force signal ~~force inputs~~ from the pointing device;

applying a dual gain transfer function having a continuous first derivative to a pointing component of the retrieved force signal ~~inputs~~ to produce a motion signal;
and

applying the motion signal to indicate ~~control~~ motion of a cursor;

wherein applying a dual gain transfer function comprises:

~~wherein:~~

~~said step of applying a dual gain transfer function comprises,~~

applying a first non-zero gain to said force signal, and

applying, if a magnitude of the pointing component is non-decreasing, a fractional part of a second gain, which is higher than said first gain, to said force signal ~~applied to said pointing device~~, wherein said fractional part of the second gain is based on

a smoothly increasing monotonic function ~~increasing smoothly and monotonically as said force applied to said pointing device increases from zero.~~

38. (Currently amended) A method of indicating selection based on a force applied to a ~~user-controlled~~ pointing device, comprising ~~the steps of:~~

determining a selection and pointing component ~~components~~ of the ~~a~~ force applied to said pointing device;

recognizing a period of relatively increasing selection force on said pointing device in which an accumulation of the selection force exceeds an integral of a magnitude of the pointing component ~~forces~~ applied on said pointing device by a predetermined selection threshold; and

determining a selection based on the recognized period; and

maintaining a current selection if the pointing component of said force does not decrease more than a predetermined rate, a magnitude of the selection component of the force does not fall below a first minimum threshold, and a magnitude of the pointing component of the force does not fall below a second minimum threshold ~~and magnitudes of both the selection and pointing components of said force do not fall below a minimum threshold; and~~

~~adjusting a selection sensitivity of the pointing device by adjusting the predetermined selection threshold.~~

39. (New) The method according to claim 15, wherein said M_n is a minimum amount of movement, said L is a first gain, said H is a second gain, said F_n is a force, and said $S(F_n)$ is an S-curve function of F_n .

40. (New) A method of determining an amount of pointer movement for a pointer, from a force applied to a pointing device, comprising:

assigning a minimum resolvable force to a fraction of a minimum amount of pointer movement; and


accumulating a plurality of fractions of the minimum amount of pointer movement, wherein an amount of pointer movement is related to a pointing component of the applied force according to a dual-gain transfer function.

41. (New) The method of claim 40 wherein the amount of pointer movement for a pointer on a display is a monotonically increasing function of the accumulated plurality of fractions of the minimum amount of pointer movement.

42. (New) The method of claim 40 wherein accumulating a plurality of fractions further comprises accumulating a plurality of fractions of the minimum amount of pointer movement until a sum of the plurality of fractions of the minimum amount of pointer movement totals at least an integral number.

43. (New) The method of claim 42 further comprising:
reporting as an integral number the sum of the fractions of the minimum
amount of pointer movement.

44. (New) The method of claim 43 whereby the integral number reported is the
greatest integral number available from the sum of plurality of fractions of the minimum
amount of pointer movement.

 45. (New) The method of claim 43 further comprising:
retaining any residual fraction of the minimum amount of pointer
movement that is greater than the integral number reported.

46. (New) The method of claim 45 further comprising:
relating the integral number reported to the amount of pointer movement
for a pointer on a display.
